

REMARKS

Claims 1-17, 18-23, and 25-27 are pending in this application and have been rejected. The claims have been amended as indicated above for the reasons described below.

Claim Rejection: 35 USC § 112

Claims 1, 15, and 19 have been rejected under 35 USC § 112, ¶2, as being indefinite for the reasons set forth on page 3 of the Office Action.

Applicant respectfully traverses this rejection because the skilled artisan would have understood this claim limitation in light of the specification. Indeed, it would appear that the Office understood the metes and bounds of the invention in its comments accompanying the rejections of the claims over several prior art references. Nevertheless, solely in an effort to expedite prosecution, Applicant has amended the claims to change the terminology used without changing the scope of the claims. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

Claim Rejection: 35 USC § 103

The Office has rejected claims 1-3, 6-8, 11-17, 19-23, and 26 under 35 USC § 103 as being unpatentable over Wakefield et al. (U.S. Patent No. 5,598,034) in view of Lin (U.S. Patent No. 5,216,283) for the reasons noted on pages 3-8. Applicant respectfully traverses this rejection.

Based on Figure 1 and its accompanying description, the Office argues that Wakefield et al. teach every limitation in the claims except for the limitation that the lead frame pad and the ceramic layer are held in contact with each other by the molding material. The Office argues

that Figure 2(a) of Lin shows a lead frame pad 20 that directly contacts a ceramic layer 14 by using only a molding material 12.

Applicant disagrees with the Office's position for several reasons. To begin with, Applicant disagrees that the Office has substantiated that Lin describes a device where a lead frame pad and a ceramic layer are led in contact with each other using only a molding material. Lin describes a device where a heat sink 14 contacts a die support member 20 of a package body 12. *See Figure 1(a) and 1(b) and accompanying text.* The heat sink 14 is attached to the die support member 20 in two different ways, as shown in Figures 2(a) and 2(b). *See column 4, lines 53-55.* In the embodiment shown in Figure 2(a), while the heat sink 14 contacts the die support member 20, these two components are held together by thermal grease 34 which is a thermally conductive "adhesive" material. *See Figure 2(a) and column 4, line 53 through column 5, line 2.* In the embodiment shown in Figure 2(b), the heat sink 14 does not contact the die support member 20 at all the epoxy layer 36 is placed between them to increase the adhesion between these two components. *See column 5, lines 11-24 and Figure 2(b).* In light of this disclosure about adhesive thermal grease 34 and epoxy 36, the skilled artisan would have understood that it is not the molding of Lin that keeps the heat sink and the die support member in contact with each other.

Such an understanding is reinforced by Lin's disclosure that the method of attaching the heat sink 14 to package body 12 occurs only "after" the molding process have previously been completed. *See column 5, lines 35-37.* In other words, the molding process is complete before these two components are attached. It therefore stands to reason that the molding material is not

used to keep these components in contact with each other and some other mechanism (i.e., adhesive thermal grease 34 or epoxy 36) is used.

Further, the Office has not provided proper motivation that would have suggested that the skilled artisan combine the prior art references in the proposed manner. The Office's proposed motivation was "better heat transfer" if the adhesive of Wakefield is eliminated. But the Office has not substantiated that better heat transfer would occur if the adhesive of Wakefield was eliminated, especially in light of the fact that Wakefield describes that adhesive 12 can be any suitable "thermally-conductive" adhesive material. *See column 4, lines 8-10.*

Indeed, the skilled artisan would have been motivated against eliminating the adhesive. Lin describes that the desired heat transfer can be obtained—and the adhesion increased—by using a thermally-conductive adhesive material. *See column 4, lines 11-14.* In light of such a disclosure, the skilled artisan would have understood that eliminating adhesive 12 of Wakefield would have only decreased the adhesion in the Figure 1 device of Wakefield, a result the skilled artisan would have not desired.

As well, combining the references as proposed by the Office would have defeated the purposes of these two references. Wakefield describe that his device purposefully traps gases and water vapor. *See column 2, lines 23-35.* Lin, however, describes that his device is designed to do the exact opposite: it purposefully vents gases and water vapor. *See column 5, lines 35-45.* Such contradictory teachings would have prompted the skilled artisan to not combine the disclosures of Wakefield and Lin.

Thus, the Office has not shown that the references as properly combined teach or suggest every limitation recited in the rejected claims. Accordingly, Applicant requests withdrawal of this ground of rejection.

Claim Rejection: 35 USC § 103

The Office has rejected claim 25 as being unpatentable over Wakefield in view of Lin and Shinohara (U.S. Patent No. 6979909) for the reasons noted on pages 9-10 of the Office Action. Applicant respectfully traverses this rejection.

The Office recognizes that the combination of Wakefield and Lin do not disclose a method for providing an outer heat sink. The Office argues that Shinohara describe an outer heat sink connected to a packaged semiconductor device and argues that it would have been obvious to include the outer heat sink in the combined teachings of Wakefield and Lin to increase the heat dissipation.

Even if the Office's argument is true, an argument Applicant traverses for the record, it does not substantiate that the combination of references teach or suggests every limitation in the rejected claims. The rejected claims contain the limitation that a lead frame pad and a ceramic layer are led in contact with each other using only a molding material. But for the reasons noted above, the Office has not shown that the combined teachings of Wakefield and Lin teach such a limitation. And the Office has not even argued—much less alleged—that Shinohara discloses such a limitation. And since neither the Wakefield/Lin combination nor Shinohara individually teaches or suggests this limitation, it would be highly unlikely that the Office could show that the combination of these references would suggest it.

Thus, the Office has not shown that a proper combination of the cited references suggests every limitation recited in the rejected claims. Accordingly, Applicant requests withdrawal of this ground of rejection.

Claim Rejection: 35 USC § 103

The Office has rejected claims 4 and 9 as being unpatentable over Wakefield in view of Lin, and further in view of Nakanishi et al. (U.S. Patent No. 6,501,156) for the reasons noted on page 10. Applicant respectfully traverses this rejection.

The Office recognizes that the combination of Wakefield and Lin do not disclose a lead frame pad formed to a thickness of 0.5 mm. The Office argues that Nakanishi describes such a limitation and argues that it would have been obvious to include this feature in the combined teachings of Wakefield and Lin to accommodate the manufacturing specification.

Even if the Office's argument is true, an argument Applicant traverses for the record, it does not substantiate that the combination of references teach or suggests every limitation in the rejected claims. The rejected claims contain the limitation of a lead frame pad and a ceramic layer are led in contact with each other using only a molding material. But for the reasons noted above, the Office has not shown that the combined teachings of Wakefield and Lin teach such a limitation. And the Office has not even argued—much less alleged—that Nakanishi discloses such a limitation. And since neither the Wakefield/Lin combination nor Nakanishi individually teaches or suggests this limitation, it would be highly unlikely that the Office could show that the combination of these references would suggest this limitation.

Thus, the Office has not shown that a proper combination of the cited references suggests every limitation recited in the rejected claims. Accordingly, Applicant requests withdrawal of this ground of rejection.

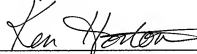
CONCLUSION

For the above reasons, as well as the reasons of record, Applicant respectfully requests the Office to withdraw the pending grounds of rejection and allow the pending claims.

If there is any fee due in connection with the filing of this Amendment, including a fee for any extension of time not accounted for above, please charge the fee to our Deposit Account No. 50-0843.

Respectfully Submitted,

By



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